

In the Claims

Cancel claims 1-96, inclusive.

Add new Claims 97-128 as follows:

97. (New) A multilayer solid-state device for producing electrical power from light comprising:

- a light energy conversion layer containing photosensitive means;
- a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;
- a charge separation layer secured to a second side of the conducting layer;
- the conducting layer and the charge separation layer defining a Schottky barrier; and
- the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer.

98. (New) A multilayer solid-state device for producing electrical power from light comprising:

- a light energy conversion layer containing photosensitive means;
- a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;
- a charge separation layer secured to a second side of the conducting layer;
- the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the light energy conversion layer comprises a plurality of different photosensitive means to maximize capture of the incident light spectrum.

99. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier; and

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the light energy conversion layer has a light receiving surface which is patterned to provide increased surface area.

100. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the light energy conversion layer is porous to provide increased surface area.

101. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the charge separation layer is porous to provide increased surface area.

102. (New) A multilayer solid-state device for producing electrical power from light comprising:

- a light energy conversion layer containing photosensitive means;
- a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;
- a charge separation layer secured to a second side of the conducting layer;
- the conducting layer and the charge separation layer defining a Schottky barrier;
- the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and
- wherein the charge separation layer is structured to provide increased surface area.

103. (New) A multilayer solid-state device for producing electrical power from light comprising:

- a light energy conversion layer containing photosensitive means;
- a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;
- a charge separation layer secured to a second side of the conducting layer;
- the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer;
- wherein the conducting layer and the charge separation layer define a metal-insulator-metal junction.

104. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer;

wherein the charge separation layer comprises a semiconductor of a first type, and further including a semiconductor of the opposite type positioned between the charge separation layer and the conducting layer to provide increased barrier height and photovoltage.

105. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the charge separation layer comprises an organic semiconductor.

106. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer;

wherein the charge separation layer comprises an insulator/semiconductor multi-layer.

107. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting comprising an ultra-thin metal film and layer having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the charge separation layer is formed from template molecules to provide an increased surface area.

108. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and wherein the charge separation layer is formed from template molecules to provide an increased surface area.

109. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the light energy conversion layer is formed from template molecules to provide an increased surface area.

110. (New) A multilayer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

a two-sided conducting layer comprising an ultra-thin metal film and having the light energy conversion layer secured to a first side thereof;

a charge separation layer secured to a second side of the conducting layer;

the conducting layer and the charge separation layer defining a Schottky barrier;

the conducting layer comprises an ultra-thin metal film for providing ballistic transport of charge carriers from the light energy conversion layer to the charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

wherein the light energy conversion layer has a light receiving surface which is provided with anti-reflection coating to reduce reflective light.

111. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer.

112. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;
the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material selected from the group consisting of merbromin, 0-phenylxanthene, and iron cyanate.

113. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material including at least one organic dye.

114. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material characterized by nanoclusters.

115. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material characterized by nanostructures.

116. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material including at least one metal cyanate.

117. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an

electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer is formed from a material including at least one metal photocyanate.

118. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer comprises a plurality of different photosensitive means to maximize capture of the incident light spectrum.

119. (New) A multi-layer solid-state device for producing electrical power from light comprising:

- a light energy conversion layer containing photosensitive means;

- an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

- a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

- the metal film and the semiconductor charge separation layer defining a Schottky barrier;

- the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

- an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer comprises a plurality of photosensitive means structures.

120. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer has a light receiving surface which is patterned to provide increased surface area.

121. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;
the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;
an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and
wherein the light energy conversion layer is porous to provide increased surface area.

122. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;
an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;
a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;
the metal film and the semiconductor charge separation layer defining a Schottky barrier;
the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the semiconductor charge separation layer comprises an organic semiconductor.

123. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the semiconductor charge separation layer comprises an insulator formed on an organic conductor.

124. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting front contact layer having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the front contact layer;

the front contact layer providing ballistic transport of electrical energy from the light energy conversion layer to the charge separation layer; and

an electrically conductive back contact secured to the second side of the charge separation layer; and

wherein the semiconductor charge separation layer comprises an insulator/semiconductor multi-layer.

125. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the semiconductor charge separation layer is formed from template molecules to provide an increased surface area.

126. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the semiconductor charge separation layer is formed from template molecules to provide an increased surface area.

127. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer; and

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the semiconductor charge separation layer is formed from template molecules to provide an increased surface area.

128. (New) A multi-layer solid-state device for producing electrical power from light comprising:

a light energy conversion layer containing photosensitive means;

an ultra-thin, two sided, electrically conducting metal film having the light energy conversion layer secured to a first side thereof;

a two sided semiconductor charge separation layer having one side thereof secured to the second side of the metal film;

the metal film and the semiconductor charge separation layer defining a Schottky barrier;

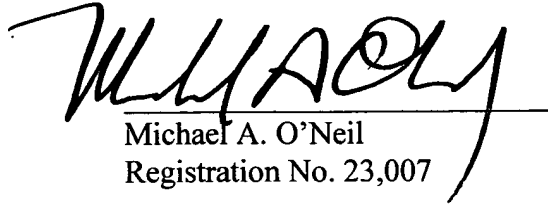
the metal film for providing ballistic transport of electrical energy from the light energy conversion layer to the semiconductor charge separation layer which eliminates the need for an electrolyte when producing electrical power from light that impinges upon the light energy conversion layer;

an electrically conductive back contact secured to the second side of the semiconductor charge separation layer; and

wherein the light energy conversion layer has a light receiving surface, and wherein the light receiving surface is provided with anti-reflection coating to reduce reflective light.

Respectfully submitted,

MICHAEL A. O'NEIL, P.C.



Michael A. O'Neil
Registration No. 23,007

Date: December 31, 2003
5949 Sherry Lane, Suite 820
Dallas, Texas 75225
(214) 739-0088
(214) 739-8284 (Fax)